

(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平10-54498

(43) 公開日 平成10年(1998) 2月24日

(51) Int.Cl. ⁸	識別記号	庁内整理番号	FI	技術表示箇所
F 1 6 L	59/18		F 1 6 L 59/18	
	57/00		57/00	A
	59/147		59/147	
// F 1 6 L	23/02		23/02	F

審査請求 有 請求項の数 3 FD (全 5 頁)

(21) 出願番号 特願平8-226124

(22) 出願日 平成8年(1996) 8月9日

(71) 出願人 591276215

日本ジャケット株式会社

埼玉県戸田市上戸田4丁目4番20号

(72) 発明者 小室 賢一

東京都狛江市東野川1-29-5

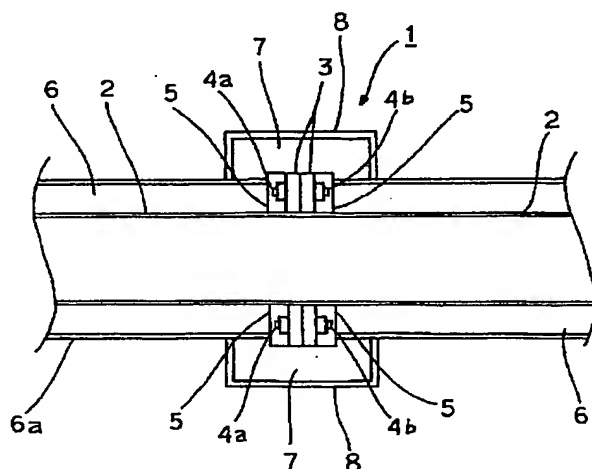
(74) 代理人 弁理士 安原 正之 (外1名)

(54) 【発明の名称】 配管接合部断熱材ユニットおよびその施工方法

(57) 【要約】

【課題】 配管接合部の断熱体を空隙を作らず被覆する作業が難しかった。

【解決手段】 配管接合部を被覆する断熱材ユニットにおいて、接合フランジ間を固定するボルトナットと、フランジより突出するボルトナットの頭部を挿入可能な孔部を有するフランジカバーパッキングと、接合フランジとフランジカバーパッキングを被覆する溝部を有する分割円筒断熱体とからなることを特徴とする配管接合部断熱材ユニットおよびその施工方法による。



BEST AVAILABLE COPY

【特許請求の範囲】

【請求項1】 配管接合部を被覆する断熱材ユニットにおいて、接合フランジ間を固定するボルトナットと、フランジより突出するボルトナットの頭部を挿入可能な孔部を有するフランジカバーバックリングと、接合フランジとフランジカバーバックリングを被覆する溝部を有する分割円筒断熱体とからなることを特徴とする配管接合部断熱材ユニット。

【請求項2】 配管接合部を被覆する断熱材ユニットにおいて、接合フランジ間を固定するボルトナットと、フランジより突出するボルトナットの頭部を挿入可能な孔部を有する2つの半円体からなるフランジカバーバックリングと、接合フランジとフランジカバーバックリングを被覆する溝部を有する2つの半円筒体からなる分割円筒断熱体とからなることを特徴とする配管接合部断熱材ユニット。

【請求項3】 配管接合部を被覆する断熱材ユニットの施工方法において、接合フランジ間をボルトナットで固定し、フランジより突出するボルトナットの頭部を、フランジカバーバックリングの孔部に挿入して固定し、次に接合フランジとフランジカバーバックリングを2つに分割可能な円筒断熱体の溝部に密接して嵌め合わせて被覆すること特徴とする配管接合部断熱材ユニットの施工方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、保冷用配管、保温用配管の配管接合部の断熱材、特に保冷用配管の接合部の断熱材およびその施工方法に関する。

【0002】

【従来の技術】空調用の保冷用配管、保温用配管や給排水用配管等の配管は、直管では筒状の断熱材ユニット（断熱体と外装材）で被覆して、配管からの熱損失の防止や、配管や表面の結露防止を図ることは従来より公知である。

【0003】通常、配管の断熱材ユニットの断熱体としては円筒状に成形されたものが使用されており、配管の直管部分へは円筒断熱体をそのまま取り付け、さらにその外側に外装材で被覆している。この円筒状の断熱体、外装材および断熱体、外装材の施工方法は公知である。

【0004】そして、これらの保冷用配管、保温用配管や給水用配管等の配管の接合部においては、管の接合部（継ぎ手部分）のフランジを当接させ、ボルトナットで締め付けて固定する。従来は、断熱材として、この外側をフェルト材またはブランケット材で覆い、空気の入りを防ぐため保冷材間の継目などに防湿用のジョイントシーラを塗り、さらにその外表面側に外装材を巻き付けていた。ジョイントシーラは油脂を基材としたものや、樹脂またはゴムを基材としたものを素材としていた。

【0005】

【発明が解決しようとする課題】従来の配管接合部では、フランジやそれを固定するボルトナットの凹凸によって、その周囲に空隙ができ易く、フェルト材またはブランケット材では、配管の周囲を密着して被覆できず空隙ができ易い課題があった。

【0006】特に、保冷用配管においては、配管の周囲に空隙があると、その空隙より入る空気の湿気が結露し配管に凍り付き事故の原因となるため、配管周囲の空隙を極力減らすことが望まれていた。

【0007】さらに、フェルト材またはブランケット材は、配管になるべく空隙を作らず密接させようとする被覆作業が難しく手間がかかるという問題点があった。

【0008】

【課題を解決する為の手段】これらの課題を解決する為、配管接合部を被覆する断熱材ユニットにおいて、接合フランジ間を固定するボルトナットと、フランジより突出するボルトナットの頭部を挿入可能な孔部を有するフランジカバーバックリングと、接合フランジとフランジカバーバックリングを被覆する溝部を有する分割円筒断熱体とからなることを特徴とする断熱材ユニットを提案する。

【0009】また、配管接合部を被覆する断熱材ユニットにおいて、接合フランジ間を固定するボルトナットと、フランジより突出するボルトナットの頭部を挿入可能な孔部を有する2つの半円体からなるフランジカバーバックリングと、接合フランジとフランジカバーバックリングを被覆する溝部を有する2つの半円筒体からなる円筒断熱体とからなることを特徴とする断熱材ユニットを提案する。

【0010】さらに、配管接合部を被覆する断熱材ユニットの施工方法において、接合フランジ間をボルトナットで固定し、フランジより突出するボルトナットの頭部を、フランジカバーバックリングの孔部に挿入して固定し、次に接合フランジとフランジカバーバックリングを2つに分割可能な円筒断熱体の溝部に密接して嵌め合わせて被覆すること特徴とする断熱材ユニットの施工方法を提案する。

【0011】

【発明の実施の形態】この発明を、実施の形態を示す図面に基づいて説明する。図1は配管接合部の断面説明図、図2乃至図5は配管接合部の断熱材ユニットの施工方法の説明図であり、図2は配管接合部のフランジにボルトナットを装着した状態の側面説明図、図3は配管接合部にフランジカバーバックリングを被覆した状態の側面説明図、図4は配管接合部に円筒断熱体を装着した状態の一部断面説明図、図5は同じく側面説明図、図6は円筒断熱体の半部分の斜視図、図7はフランジカバーバックリングの斜視図である。

【0012】1は配管接合部である。配管2は、配管端部にあるフランジ3同士によって接合する。

【0013】配管接合部1のフランジ3は、一般的に配管2の外径の倍以上の外径である。

【0014】配管接合部1の接合は、当接されたフランジ3の複数のボルト孔にボルト4aを挿通させ、ボルト4aの両側をナット4bによって締め付けて固定される。

【0015】フランジ3から突出するボルト4aおよびナット4bは、フランジカバーパッキング5の孔5aに入れて被覆される。フランジカバーパッキング5は、2つの半輪形の板状体2つを合わせて1つの輪形状に形成される。

【0016】フランジカバーパッキング5は、輪形状の外径がフランジ3の外径に対応し、内径が配管2の外径に対応する。フランジカバーパッキング5の厚さは、約15mm〜20mmであるが、孔5aよりボルト4aが突出しない厚さがあればよい。

【0017】フランジカバーパッキング5は、架橋ポリエチレンフォーム等の素材からなり、フランジ3をボルトナット止めした後、配管2の配管断熱体6、配管外装材6aの上両側から半分づつ被覆していく。

【0018】7は、接合部断熱体である円筒断熱体である。2分割されている円筒断熱体7は、内側の嵌合溝7aにフランジカバーパッキング5、フランジ3を嵌合させて装着する。円筒断熱体7は、円筒体を筒の円中心に沿って縦方向に2分割されており、それぞれの半円筒体は縦方向にわたる凹部である配管断熱体接合溝7bと、配管断熱体接合溝7bの中央部にさらに凹んだ円周方向の凹部である嵌合溝7aを設けてある。

【0019】嵌合溝7aの幅は、フランジカバーパッキング5とフランジ3の合わせた厚さとほぼ同じで、深さは、フランジカバーパッキング5とフランジ3の外径と配管2の配管断熱体6の外径との差である。

【0020】円筒断熱体7は、加熱押圧して硬化した状態で断熱性を有する素材であればよいが、この実施の形態ではグラスウール繊維で形成される。他の実施の形態としては、綿状のセラミック繊維等の無機繊維に、熱硬化樹脂であるフェノール樹脂を加えた素材を使用する。円筒断熱体7は、表面側外周上に外装材8であるアルミ箔を製造時に被覆しておく。

【0021】次に、この発明の断熱材ユニットの施工方法について説明する。

【0022】配管接合部断熱材ユニットを形成する一対の円筒断熱体7は、被覆する配管接合部1の配管2の外径等に対応させ2つの接合面11を合致させ、その外周を外装材8で巻き付けて貼り付ける。外装材8は、円筒断熱体7の外周接合面に合わせて切断される。これにより、一対の円筒断熱体7は、外装材8によって折り曲げ自在に接続されており開閉自在である。

【0023】配管接合部断熱材ユニットを形成するフランジカバーパッキング5は、配管フランジ3の大きさに

合わせた複数の孔5aを有する2つの半輪形の板状体2つからなる。

【0024】配管接合部1は配管2のフランジ3同士をボルトナット4で固定する。次にフランジカバーパッキング5の2つ半輪形を、フランジ3より突出しているボルト4aの頭部およびナット4bの頭部に、それぞれ孔5aを合わせ入れる。このときフランジカバーパッキング5の内周は、配管2の外周に装着されている配管外装材6aに密接する。

【0025】フランジカバーパッキング5は、この作業によって2つの配管2のフランジ3の両側から取り付けられる。

【0026】次に、分割された半分の円筒断熱体7のそれぞれの嵌合溝7aを、2つのフランジ3、3とフランジカバーパッキング5、5に嵌合させて被覆する。このとき、円筒断熱体7の配管断熱体接合溝7bの溝面は、配管外装材6aに密接する。さらに、空気の侵入を防ぐため、保冷材間の継目などに防湿用のジョイントシーラを塗る。

【0027】

【発明の効果】この発明の配管接合部断熱体によれば、配管接合部を含めた管表面と断熱体内面との間に隙間ができにくい為、配管全体に互って結露しにくい。特に保冷用配管の接合部において結露する空隙を作らないため、保冷効果を損なうことが少ない。

【0028】さらに配管接合部における接合部断熱体の取り付け作業が、結露し易い隙間を作らず密接されて非常に簡単にできる。

【図面の簡単な説明】

【図1】 配管接合部の断面説明図

【図2】 配管接合部のフランジにボルトナットを装着した状態の側面説明図

【図3】 配管接合部にフランジカバーパッキングを被覆した状態の側面説明図

【図4】 配管接合部に円筒断熱体を装着した状態の一部断面説明図

【図5】 同じく側面説明図

【図6】 円筒断熱体の半部分の斜視図

【図7】 フランジカバーパッキングの斜視図

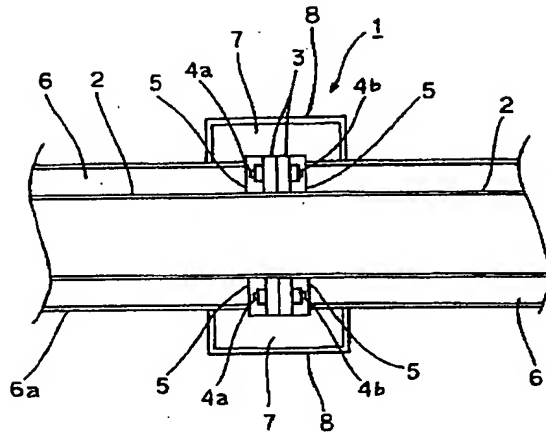
【符号の説明】

- 1 配管接合部
- 2 配管（保冷用）
- 3 フランジ
- 4 ボルトナット
- 4 a ボルト
- 4 b ナット
- 5 フランジカバーパッキング
- 5 a 孔
- 6 配管断熱体
- 6 a 配管外装材

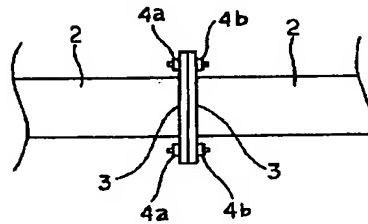
7 円筒断熱体
7a 嵌合溝

7b 配管断熱体接合溝
8 円筒断熱体の外装材

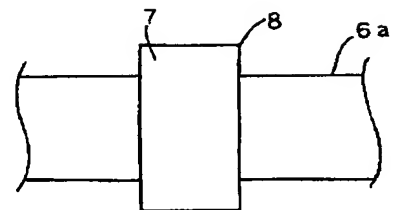
【図1】



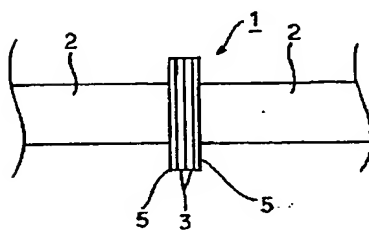
【図2】



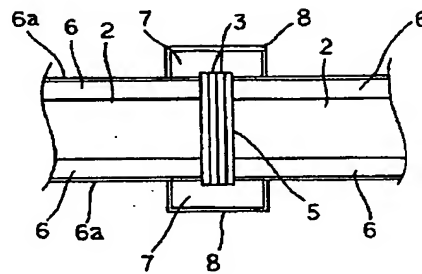
【図5】



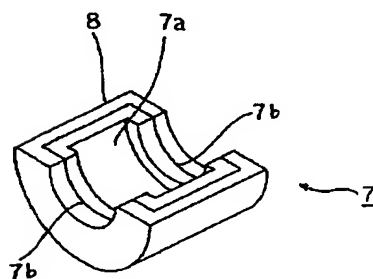
【図3】



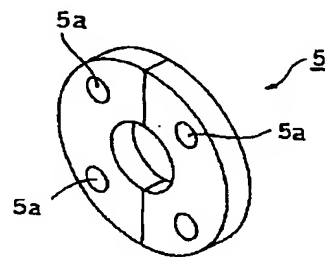
【図4】



【図6】



【図7】



【手続補正書】

【提出日】平成9年10月17日

【手続補正1】

【補正対象書類名】図面

【補正対象項目名】図6

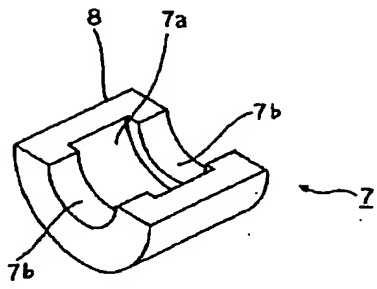
【補正方法】変更

【補正内容】

【図6】

(5)

特開平10-54498



* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

Bibliography

- (19) [Publication country] Japan Patent Office (JP)
(12) [Kind of official gazette] Open patent official report (A)
(11) [Publication No.] JP,10-54498,A
(43) [Date of Publication] February 24, Heisei 10 (1998)
(54) [Title of the Invention] A piping joint heat insulator unit and its construction approach
(51) [International Patent Classification (6th Edition)]

F16L 59/18
57/00
59/147
// F16L 23/02

[FI]

F16L 59/18
57/00 A
59/147
23/02 F

- [Request for Examination] Tamotsu
[The number of claims] 3
[Mode of Application] FD
[Number of Pages] 5
(21) [Application number] Japanese Patent Application No. 8-226124
(22) [Filing date] August 9, Heisei 8 (1996)
(71) [Applicant]
[Identification Number] 591276215
[Name] Japan jacket incorporated company
[Address] 4-4-20, Kami-toda, Toda-shi, Saitama-ken
(72) [Inventor(s)]
[Name] Areole Ken-ichi
[Address] 1-29-5, Higashi-Nogawa, Komae-shi, Tokyo
(74) [Attorney]
[Patent Attorney]
[Name] Yasuhara Masayuki (besides one person)

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.

3. In the drawings, any words are not translated.

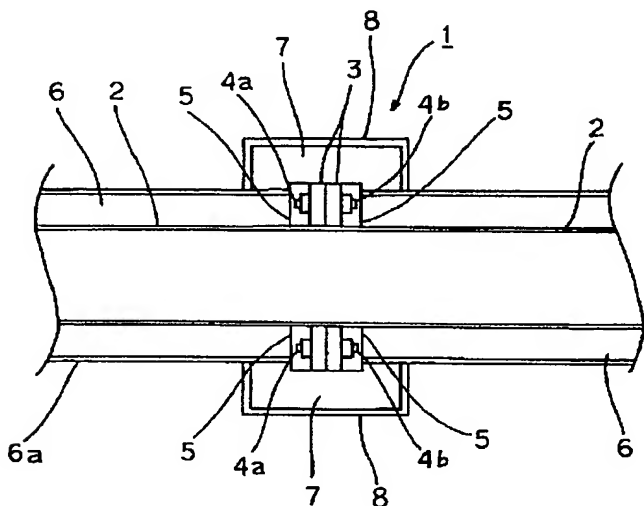
Epitome

(57) [Abstract]

[Technical problem] The activity which does not make an opening but covers the heat-insulating element of a piping joint was difficult.

[Means for Solution] It is based on the piping joint heat insulator unit characterized by to consist of flange covering packing which has the pore which can insert the head of the bolt nut which fixes between junction flanges, and the bolt nut which projects from a flange in the heat insulator unit which covers a piping joint, and a junction flange and the division cylinder heat-insulating element which has the slot which covers flange covering packing, and its construction approach.

[Translation done.]



[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The piping joint heat insulator unit characterized by consisting of flange covering packing which has the pore which can insert the head of the bolt nut which fixes between junction flanges, and the bolt nut which projects from a flange in the heat insulator unit which covers a piping joint, and a junction flange and the division cylinder heat-insulating element which has the slot which covers flange covering packing.

[Claim 2] The piping joint heat insulator unit characterized by to consist of a division cylinder heat-insulating element which consists of two semicircle barrels which have the slot which covers flange covering packing which consists of two semicircle objects which have the pore which can insert the head of the bolt nut which fixes between junction flanges, and the bolt nut which projects from a flange in the heat insulator unit which

covers a piping joint, and a junction flange and flange covering packing.

[Claim 3] The construction approach of the piping joint heat insulator unit which fixes between junction flanges with a bolt nut, inserts in the pore of flange covering packing the head of the bolt nut which projects from a flange, is fixed in the construction approach of the heat insulator unit which covers a piping joint, and then is covering [it is close to the slot of the cylinder heat-insulating element which can be divided into two, insert in and] characterized by the junction flange and flange covering packing.

[Translation done.]

*** NOTICES ***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the heat insulator of the piping joint of piping for heat insulation, and piping for incubation especially the heat insulator of the joint of piping for heat insulation, and its construction approach.

[0002]

[Description of the Prior Art] As for piping, such as piping for heat insulation for air-conditioning, piping for incubation, and piping for water works, in a straight pipe, it is better known than before to cover with a tubed heat insulator unit (a heat-insulating element and sheathing material), and to aim at prevention of the heat loss from piping, piping, and surface dew condensation prevention.

[0003] Usually, what was fabricated in the shape of a cylinder as a heat-insulating element of the heat insulator unit of piping is used, the cylinder heat-insulating element was attached in the straight pipe part of piping as it was, and it has covered with the sheathing material on the outside further. The enforcement approach of the heat-insulating element of the shape of this cylinder, a sheathing material and a heat-insulating element, and a sheathing material is well-known.

[0004] And in the joint of piping, such as these piping for heat insulation, piping for incubation, and piping for water supply, the flange of the joint (splice part) of tubing is made to contact, and it binds tight and fixes with a bolt nut. Conventionally, this outside was covered by felt material or blanket material, as a heat insulator, in order to prevent invasion of air, the joint sealer for moisture proof was applied to the joint between cold insulators etc., and the sheathing material was further twisted around that outside-surface side. The joint sealer was made from what used fats and oils as the base material, and the thing which used resin or rubber as the base material.

[0005]

[Problem(s) to be Solved by the Invention] In the conventional piping joint, the technical problem which an opening tends to be made to the perimeter, and cannot stick and cover the perimeter of piping with the irregularity of the bolt nut which fixes a flange and it at felt material or blanket material, but can tend to do an opening occurred.

[0006] Especially, if an opening was located to the perimeter of piping in piping for heat insulation, since the moisture of the air which enters from the opening would dew, it would freeze onto piping and it would become the cause of accident, to reduce the opening of the perimeter of piping as much as possible was desired.

[0007] Furthermore, felt material or blanket material had the trouble of the covering activity in which it is going to make an opening close [make and] to piping if possible having been difficult, and taking time and effort.

[0008]

[Means for Solving the Problem] The heat insulator unit characterized by consisting of flange covering packing which has the pore which can insert the head of the bolt nut which fixes between junction flanges, and the bolt

nut which projects from a flange in the heat insulator unit which covers a piping joint, and a junction flange and the division cylinder heat-insulating element which has the slot which covers flange covering packing in order to solve these technical problems is proposed.

[0009] Moreover, the heat insulator unit characterized by to consist of a cylinder heat-insulating element which consists of two semicircle barrels which have the slot which covers flange covering packing which consists of two semicircle objects which have the pore which can insert the head of the bolt nut which fixes between junction flanges, and the bolt nut which projects from a flange in the heat insulator unit which covers a piping joint, and a junction flange and flange covering packing proposes.

[0010] Furthermore, between junction flanges is fixed with a bolt nut, and the head of the bolt nut which projects from a flange is inserted in the pore of flange covering packing, it fixes in the construction approach of the heat insulator unit which covers a piping joint, and the construction approach of the heat insulator unit covering [it is close to the slot of the cylinder heat-insulating element which can be divided into two, insert in, and] characterized by the junction flange and flange covering packing next proposes.

[0011]

[Embodiment of the Invention] This invention is explained based on the drawing in which the gestalt of operation is shown. Cross-section explanatory view, drawing 2, or drawing 5 of drawing 1 of a piping joint is the explanatory view of the construction approach of the heat insulator unit of a piping joint. The side-face explanatory view in the condition that drawing 2 equipped the flange of a piping joint with the bolt nut, the side-face explanatory view in the condition that drawing 3 covered flange covering packing to the piping joint, and a part of condition that drawing 4 equipped the piping joint with the cylinder heat-insulating element -- a cross-section explanatory view and drawing 5 are the same, and the perspective view of the half-part of a cylinder heat-insulating element and drawing 7 of a side-face explanatory view and drawing 6 are the perspective views of flange covering packing.

[0012] 1 is a piping joint. Piping 2 is joined by flange 3 comrades in a piping edge.

[0013] Generally the flange 3 of the piping joint 1 is the outer diameter beyond twice of the outer diameter of piping 2.

[0014] Junction of the piping joint 1 makes bolt 4a insert in two or more boltholes of the contacted flange 3, binds the both sides of bolt 4a tight by nut 4b, and is fixed.

[0015] Bolt 4a and nut 4b which project from a flange 3 are put into hole 5a of the flange covering packing 5, and are covered. The flange covering packing 5 is formed in the shape of [in all / one] annular shape in two plates of two half-annular shape.

[0016] An annular shape-like outer diameter is equivalent to the outer diameter of a flange 3, and, as for the flange covering packing 5, a bore is equivalent to the outer diameter of piping 2. Although the thickness of the flange covering packing 5 is about 15mm - 20mm, the thickness in which bolt 4a does not project from hole 5a should just have it.

[0017] After the flange covering packing 5 consists of materials, such as bridge formation polyethylene foam, and carries out the bolt nut stop of the flange 3, it is covered by one half from the piping heat-insulating element 6 of piping 2, and the upper both sides of piping sheathing-material 6a.

[0018] 7 is a cylinder heat-insulating element which is a joint heat-insulating element. The cylinder heat-insulating element 7 currently divided into two carries out fitting of the flange covering packing 5 and the flange 3 to inside fitting slot 7a, and equips it with them. Two ****s of the cylinder heat-insulating elements 7 are made into the lengthwise direction along the circle core of a cylinder in the cylinder object, and each semicircle barrel has prepared fitting slot 7a which is the crevice of a circumferencial direction dented further in the center section of piping heat-insulating element junction slot 7b which is a crevice covering a lengthwise direction, and piping heat-insulating element junction slot 7b.

[0019] The width of face of fitting slot 7a is almost the same as the thickness which the flange 3 doubled with the flange covering packing 5, and the depth is the difference of the flange covering packing 5, the outer diameter of a flange 3, and the outer diameter of the piping heat-insulating element 6 of piping 2.

[0020] Although the cylinder heat-insulating element 7 should just be a material which has adiathermic in the condition of having carried out heating press and having hardened, it is formed for glass wool fiber by the gestalt of this operation. The material which added the phenol resin which is heat-curing resin to inorganic fibers, such as cotton-like ceramic fiber, as a gestalt of other operations is used. The cylinder heat-insulating element 7 covers the aluminum foil which is a sheathing material 8 on the front-face side periphery at the time of manufacture.

[0021] Next, the construction approach of the heat insulator unit this invention is explained.

[0022] Make the cylinder heat-insulating element 7 of the pair which forms a piping joint heat insulator unit correspond to the outer diameter of the piping 2 of the piping joint 1 to cover etc., it makes two planes of

composition 11 agree, and twists sticks the periphery by the sheathing material 8. A sheathing material 8 is cut according to the periphery plane of composition of the cylinder heat-insulating element 7. Thereby, the sheathing material 8 connects free [bending], and the cylinder heat-insulating element 7 of a pair can be opened and closed freely.

[0023] The flange covering packing 5 which forms a piping joint heat insulator unit consists of two plates of two half-anular shape which has two or more hole 5a doubled with the magnitude of the piping flange 3.

[0024] The piping joint 1 fixes flange 3 comrades of piping 2 with the bolt nut 4. Next, hole 5a is doubled with the head of bolt 4a which has projected the half [two] anular shape of the flange covering packing 5 from the flange 3, and the head of nut 4b, respectively. At this time, the inner circumference of the flange covering packing 5 is close to piping sheathing-material 6a with which the periphery of piping 2 is equipped.

[0025] The flange covering packing 5 is attached from the both sides of the flange 3 of two piping 2 according to this activity.

[0026] Next, fitting of each fitting slot 7a of the cylinder heat-insulating element 7 of the divided one half is carried out to two flanges 3 and 3 and flange covering packing 5 and 5, and it is covered. At this time, the groove surface of piping heat-insulating element junction slot 7b of the cylinder heat-insulating element 7 is close to piping sheathing-material 6a. Furthermore, in order to prevent invasion of air, the joint sealer for moisture proof is applied to the joint between cold insulators etc.

[0027]

[Effect of the Invention] since a clearance cannot be made easily between tubing front faces and heat-insulating element insides including a piping joint according to the piping joint heat-insulating element of this invention, it continues and is alike and hard to dew the whole piping. In order not to make the opening which dews in the joint of piping for heat insulation especially, it is rare to spoil the heat insulation effectiveness.

[0028] Furthermore, installation of the joint heat-insulating element in a piping joint makes and is close, and it can simplify very much the clearance which is easy to dew.

[Translation done.]

*** NOTICES ***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The cross-section explanatory view of a piping joint

[Drawing 2] The side-face explanatory view in the condition of having equipped the flange of a piping joint with the bolt nut

[Drawing 3] The side-face explanatory view in the condition of having covered flange covering packing to the piping joint

[Drawing 4] The condition of having equipped the piping joint with the cylinder heat-insulating element is a cross-section explanatory view a part.

[Drawing 5] Similarly it is a side-face explanatory view.

[Drawing 6] The perspective view of the half-part of a cylinder heat-insulating element

[Drawing 7] The perspective view of flange covering packing

[Description of Notations]

1 Piping Joint

2 Piping (for Heat Insulation)

3 Flange

4 Bolt Nut

4a Bolt

4b Nut
5 Flange Covering Packing
5a Hole
6 Piping Heat-insulating Element
6a Piping sheathing material
7 Cylinder Heat-insulating Element
7a Fitting slot
7b Piping heat-insulating element junction slot
8 Sheathing Material of Cylinder Heat-insulating Element

[Translation done.]

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.